be modern, but are certainly not good practice. The author's explanation why field magnets are laminated is novel, and, moreover, so peculiar that it merits verbal quotation. He says:—

> "The field cores are often laminated throughout to prevent eddy currents due to any swinging of the field caused by armature reaction, and this often leads to special methods of support."

Had he said that magnets must be laminated if the stator slots are wide and open, he would have been right, but the explanation he gives is quite beside the mark. Equally misleading is his indiscriminate recommendation of damping coils as a cure for hunting. As he mentions these coils just after saying that hunting is especially the fault of gas-engine driven machines, the reader is led to conclude that the damping coils would be especially useful in such cases, whereas every expert knows that damping coils are absolutely harmful if applied to an alternator driven by a gas engine.

GISBERT KAPP.

STOKES'S SCIENTIFIC CAREER AND INFLUENCE.

Memoir and Scientific Correspondence of the late Sir George Gabriel Stokes, Bart., Past Pres.R.S. Selected and arranged by Prof. Joseph Larmor, Sec.R.S. Vol. i., pp. iv+475; vol. ii., pp. vi+507. (Cambridge: The University Press, 1907.) Price 24s. net, two volumes.

IT is well known that the record of Stokes's work, splendid as it is, which is contained in the five volumes of his collected papers is far from being a complete representation of the services which during a long life he rendered to science. From his first official connection with the Royal Society in 1854 the tide of production began somewhat to slacken, and after 1868, it may almost be said, no sustained piece of work of first-rate magnitude appeared under his name, although shorter papers, often of great value, and all showing the impress of the master-hand, were given out from time to time. His energies did not relax, and his powers never showed any sign of decay, but they were diverted into somewhat different channels. Partly owing to the rigorous sense in which he construed the duties of his various official positions, and partly in consequence of his own inexhaustible good nature, he was constantly occupied in examining, advising upon, and assisting in the work of others.

This gradual change in the manner of his work has been often wondered at, and sometimes deplored, but it came about quite consistently. There is a certain type of professional *savant* to whom systematic production, or at all events publication, with due form and circumstance, is as the breath of his nostrils; it must be maintained at all hazards. With this type Stokes had never any affinity. He took to mathematical physics, in the first instance, because his interests and his powers lay that way, and he published the results of his investigations, when they seemed valuable enough, as a matter of course; but when other duties came which had, as he thought, a more immediate claim, he turned to them without a moment's regret at the diminished opportunities of personal achievement which they involved.

For a complete memorial it was therefore essential that some presentation should be made of this important phase of his work. As Prof. Larmor explains, in the preface to the two volumes now before us, the material in the shape of letters is abundant; but it is naturally very varied in character, and often fragmentary, and much of it was from one cause or another difficult to turn to account. The labour of sifting and arranging the correspondence must have been enormous, and appears to have been aggravated by the circumstance of fresh letters continually coming to hand during the printing.

The material finally selected has been dealt with as follows. In "Section II." we have an outline of Stokes's general scientific career, illustrated by a chronological series of letters, which touch upon the various topics which at different stages attracted his attention. "Section III. A" contains "special scientific correspondence" with his father-in-law, Dr. R. Robinson, Prof. Cayley, and Sir J. Norman Lockyer. These letters contain matter which is, in different ways, of great interest; the letters to Dr. Robinson are specially valuable, as they preserve many interesting notes and explanations which would otherwise have been lost. The second volume continues "Section III.," and includes letters to and from Maxwell, Joule, Rayleigh, Reynolds, Froude, Airy, and others, nearly all bearing on scientific work of the first order actually in progress. It would be hopeless, and useless, to attempt an enumeration of the various points touched upon; but it is of interest to note with what zest Stokes turns, again and again, to the early objects of his scientific affections, such as the behaviour of sea-waves, the theory of the pendulum, and the varied problems of physical optics. The collection is most of all valuable in that we are allowed a glimpse into the workshop of the master. The most expert craftsman will find much to admire, whilst the novice may derive suggestion and encouragement, more perhaps than from the contemplation of the finished work, which is often apt to beget rather feelings of despair.

These volumes include also matter of a more formal biographical character. The introductory memoir by Mrs. Lawrence Humphry is a most attractive personal record, written with admirable tact and sincerity. To this are appended "appreciations" by intimate personal friends, Prof. Liveing, Sir Michael Foster, Sir William Huggins, and the Bishop of Bristol. Considerable space is devoted to the Jubilee celebration of 1899, and to the proceedings at the unveiling of the Westminster Abbey memorial. Both these occasions greatly impressed those who had the privilege of attending them, and the record will be highly valued.

All who are interested in Stokes and his work, in other words, the whole company of followers of physical science, will feel a deep debt of gratitude to Prof. Larmor for the devoted labour which he has expended on this memorial of his great predecessor. It appears, indeed, that our obligations to him are not yet exhausted. The reader of this notice will have remarked

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the absence of all reference to the relations between Stokes and Lord Kelvin. We are told that this long scientific friendship is to be commemorated by a special volume of correspondence. There can be no question as to the propriety of this arrangement, and the volume will be looked for with the liveliest interest.

HORACE LAMB.

FIVE SMALL GEOGRAPHIES.

Our Own Islands. By H. J. Mackinder. Pp. xv+298. (London: George Philip and Son, Ltd., n.d.) Price 2*s.* 6*d.*

The Oxford Geographies. Vol. I. The Preliminary Geography. By A. J. Herbertson. Pp. viii+149. (Oxford: Clarendon Press, 1906.) Price 1*s.* 6*d.*

The Oxford Geographies. Vol. III. The Senior Geography. By A. J. Herbertson and F. D. Herbertson. Pp. viii+363. (Oxford: Clarendon Press, 1907.) Price 2*s.* 6*d.*

The Dominion of Man. By Ernest Protheroe. Pp. xii+215. (London: Methuen and Co., n.d.) Price 2*s.*

Notes upon the Island of Dominica (British West Indies). By Symington Grieve. Pp. 126. (London: A. and C. Black, 1906.) Price 2*s.* 6*d.* net.

ALTHOUGH no close comparison can be made between the two elementary reading-books in geography which Mr. Mackinder and Dr. Herbertson have given us, since the former deals with the British Isles and the latter with the whole world, yet we may note certain similarities of method. Both build up their descriptions about an imaginary journey from place to place; both endeavour to present physical and industrial geography as cause and effect; both largely use diagram-maps, partly to supplement the atlas, partly to stimulate the use of it; and both adopt, to some extent, the method of "teaching by question." While this last innovation is a step in the right direction, it is but a hesitating step. The full advantage of this method cannot be obtained by occasional interpolations of questions or suggestions for map-study amid the descriptive matter. Such interruptions are apt to be shelved until a more convenient season that may never come.

Mr. Mackinder's book is arranged on a progressive plan. While map scales and directions are taken at the outset, contour-lines are not explained until half-way through the book. Description starts with the north of England, the uplands and lowlands of which present an easy contrast. Scotland follows, then Ireland, Wales, and finally the Midlands and south and east of England. Simply and lucidly written, with many views and maps, it is a most readable book. We must, however, object to county-towns being called "capitals" (p. 143), to the coupling of Shropshire (strictly Shrewsburyshire) with Berkshire as a county name not derived from a town (p. 263), and to the printing of Macaulay's magnificent Armada lines cut in halves (p. 275).

Dr. Herbertson is unconventional in the order in which he takes the continents, starting with the Americas, because their physical and climatic conditions lend themselves best to simple generalisations, and they thus serve as a type with which Asia, Australia, Africa, and Europe are in turn contrasted. The immensity of the subject-matter renders occasional "scrappiness" of treatment inevitable, though in general this has been very successfully avoided, and attention concentrated on broad general features and contrasts. Altogether, it is a refreshing change from the old-fashioned dry text-books, but it needs supplementing with views to enable the child to realise the scenes described.

Both books have suffered a little from the troubles incidental to process-illustrations. The hemispheres on p. 3 of the "Preliminary Geography" are not all printed the right way up (this should have been avoided by processing them in pairs, instead of singly); and a phantom coalfield appears in Cheshire in Fig. 37 of "Our Own Islands."

By dividing the world into natural regions and showing how political divisions are related to these, Dr. and Mrs. Herbertson have produced an altogether admirable book. Particularly to be noticed is the treatment of the Alps as a whole, and the historical development of the Central European States in relation to them. There are only two small matters on which it occurs to us that the student needs further enlightenment—viz., the use of *Mont* for the names of passes as well as of peaks in the Western Alps (it is a common mistake to cite Mt. Cenis as a peak), and the misleading name of the first Alpine railway tunnel, taken from the Mt. Cenis carriage-route which it superseded. The historical summaries given for each country are very well done. We have noticed very few mistakes. *West* Indies, on p. 105, should surely be *East*; William the Conqueror did not march down stream from Wallingford (p. 142); and the statement on p. 68 as to the origin of Boulder-clay is rather dogmatic for so disputed a subject. It is difficult to be consistent in the spelling of European place-names, but to us at least *Luzern* looks as out-of-place in an English sentence as would Torino or Firenze. These are trivial criticisms on a book the reading of which has given us a great amount of pleasure, and which should become the standard geography for schools.

Mr. Protheroe has produced a well-arranged treatise on the commercial products of all parts of the world, on communications, towns and markets. His enthusiasm for civilisation and progress gives his style a floweriness which is occasionally overdone, but his book is very readable. It is illustrated by a well-chosen series of photographs, and while not exactly a school-book, should be very useful to teachers of geography and to those numerous persons who wish to make good the deficiencies in their knowledge of commercial geography. We have noticed a few errors, the worst being the derivation of Portland cement from Portland stone (p. 94).

Mr. Symington Grieve recently paid a visit of investigation to Dominica, in the Lesser Antilles, and now gives an interesting account of the island, its natural productions and people, illustrated by photographs taken on his expedition. To anyone intending to visit the island, whether as tourist, naturalist, or trader, the book may be recommended as an excellent guide.

A. M. D.

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